

Drifting Continents

Key Concepts

- What was Alfred Wegener's hypothesis about the continents?
- What evidence supported Wegener's hypothesis?
- Why was Alfred Wegener's theory rejected by most scientists of his day?

In 1910, a young German scientist named Alfred Wegener wondered why the coasts of several continents matched so well, like the pieces of a jigsaw puzzle. He formed a hypothesis that Earth's continents had moved! **Wegener's hypothesis was that all the continents had once been joined together in a single landmass, and have since drifted apart.** He named this supercontinent Pangaea, meaning "all lands." According to Wegener, **Pangaea** existed about 300 million years ago. Over tens of millions of years, Pangaea began to break apart. The pieces of Pangaea slowly moved toward their present-day locations, becoming the continents of today. The theory that the continents slowly moved over Earth's surface became known as **continental drift**. In a book called *The Origin of Continents and Oceans*, Wegener presented his evidence. **Wegener gathered evidence from different scientific fields to support his ideas about continental drift. He studied land features, fossils, and evidence of climate change.**

Mountain ranges and other landforms provided evidence for continental drift. Mountains are usually found in narrow strips along the edges of continents. Wegener hypothesized that when continents collide, their edges crumple and fold. The folding continents push up huge mountains. He noticed that when he pieced together maps of Africa and South America, a mountain range running from east to west in South Africa lines up with a mountain range in Argentina. Also, European coal fields match up with coal fields in North America.

Fossils also provided evidence to support Wegener's theory. A fossil is any remains of an ancient organism preserved in rock. The fossils of the reptiles *Mesosaurus* and *Lystrosaurus*, and a fernlike plant called *Glossopteris* have been found on widely separated landmasses. Wegener believed that these organisms lived on a single landmass that has since split apart.

Wegener used evidence from climate change to further support his theory. For example, an island in the Arctic Ocean contains fossils of tropical plants. According to Wegener, the island once must have been located close to the equator. Wegener also pointed to scratches on rocks made by glaciers. These scratches show that places with warm climates today once had climates cold enough for glaciers to form. According to Wegener's theory, Earth's climate has not changed. Instead, the positions of the continents have changed.

Wegener also tried to explain how the drift of continents took place. **Unfortunately, Wegener could not explain the force that pushes or pulls the continents.** Because he could not identify the cause of continental drift, most geologists rejected his theory. For nearly half a century, from the 1920s to the 1960s, most scientists paid little attention to the idea of continental drift. Then new evidence about Earth's structure led scientists to reconsider Wegener's bold theory.

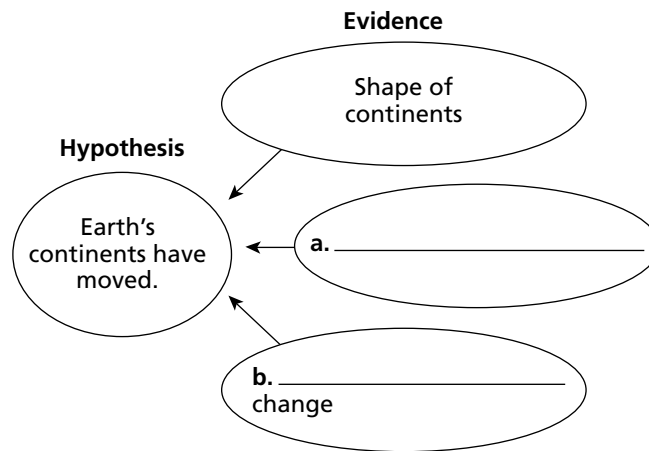
Plate Tectonics ▪ *Guided Reading and Study*

Drifting Continents

This section describes a theory of how the continents moved to where they are today. The section also describes evidence for the theory of continental drift and explains why the theory was not accepted for many years.

Use Target Reading Skills

As you read about the evidence that supports the theory of continental drift, complete the graphic organizer.



Continental Drift

1. State Alfred Wegener's hypothesis about how Earth's continents have moved.

2. Wegener named his supercontinent _____.

3. What did Wegener think had happened to this supercontinent?

4. Wegener's idea that the continents slowly moved over Earth's surface became known as _____.

5. Circle the letter of each sentence that supports Wegener's hypothesis.
- a. Some continents match up like jigsaw puzzle pieces.
 - b. Different rock structures are found on different continents.
 - c. Fossils of tropical plants are found near the equator.
 - d. Continental glaciers once covered South Africa.
6. Give an example of evidence from land features that supported Wegener's idea of continental drift. _____

7. Any remains of an ancient organism preserved in rock are called _____.
8. How did Wegener explain similar fossils on different continents?

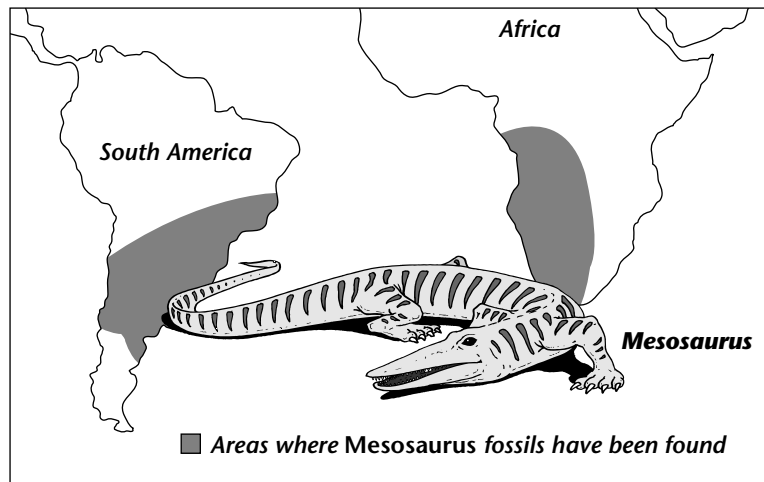
9. Is the following sentence **true** or **false**? Wegener believed that continental drift explained fossils of tropical plants found in places that today have a cold climate.

Wegener's Hypothesis Rejected

10. How did Wegener think that mountains formed? _____

11. How do the locations of mountains support Wegener's idea about how mountains form? _____

The Curious Case of *Mesosaurus*



About 265 million years ago, a reptile called *Mesosaurus* lived in just a few places on Earth. This small, lizard-like reptile measured 71 centimeters from its nose to the tip of its tail—or about two-thirds of a meter. Its body was long and flexible, which was perfect for swimming quickly through the water. *Mesosaurus* was a hunter of small fish and other aquatic animals. Its webbed feet and long tail worked like powerful paddles as it chased and captured its food. Like all other reptiles, *Mesosaurus* breathed air, so it had to return to the surface after hunting underwater. Freshwater ponds and lakes were its habitat.

In the 1800s, scientists began finding fossils of these ancient reptiles, which had long since become extinct. These fossils were found in only two regions: southern Africa and the southern part of South America. The shaded areas on the map show where fossils of *Mesosaurus* have been discovered. This distribution is a strange one—only two regions that are far from each other and separated by the Atlantic Ocean. What could explain this distribution?

Answer the following questions.

1. Describe the kind of environment in which *Mesosaurus* lived.
2. Is it possible that *Mesosaurus* swam back and forth across the Atlantic Ocean? Explain.
3. What could explain this distribution of *Mesosaurus* fossils?
4. Does the case of *Mesosaurus* support Wegener's theory of continental drift? Explain why or why not.
5. Does the case by itself prove the theory? Explain why or why not.